

## COURSE OUTLINE

### 1. GENERAL

<b>SCHOOL</b>	Engineering		
<b>DEPARTMENT</b>	Environmental Engineering		
<b>LEVEL OF STUDIES</b>	7		
<b>COURSE CODE</b>	15ZY5N	<b>SEMESTER</b>	Winter
<b>COURSE TITLE</b>	Air Pollutant Dispersion Simulations		
<b>TEACHING ACTIVITIES</b> <i>If the ECTS Credits are distributed in distinct parts of the course e.g. lectures, labs etc. If the ECTS Credits are awarded to the whole course, then please indicate the teaching hours per week and the corresponding ECTS Credits.</i>	<b>TEACHING HOURS PER WEEK</b>	<b>ECTS CREDITS</b>	
	3	5	
<i>Please, add lines if necessary. Teaching methods and organization of the course are described in section 4.</i>			
<b>COURSE TYPE</b> <i>Background, General Knowledge, Scientific Area, Skill Development</i>	Compulsory		
<b>PREREQUISITES:</b>			
<b>TEACHING &amp; EXAMINATION LANGUAGE:</b>	Greek		
<b>COURSE OFFERED TO ERASMUS STUDENTS:</b>	<a href="https://eclass.duth.gr/">https://eclass.duth.gr/</a>		
<b>COURSE URL:</b>			

### 2. LEARNING OUTCOMES

<b>Learning Outcomes</b> <i>Please describe the learning outcomes of the course: Knowledge, skills and abilities acquired after the successful completion of the course.</i>																		
<ul style="list-style-type: none"> <li>• Knowledge of air pollution simulation tools context</li> <li>• Knowledge of air dispersion processes</li> <li>• Knowledge of the combined mesoscale meteorology - dispersion processes</li> <li>• Use of air dispersion modelling</li> <li>• Apply air dispersion modelling to predict pollutant concentrations</li> </ul>																		
<b>General Skills</b> <i>Name the desirable general skills upon successful completion of the module</i>																		
<table border="0"> <tr> <td><i>Search, analysis and synthesis of data and information,</i></td> <td><i>Project design and management</i></td> </tr> <tr> <td><i>ICT Use</i></td> <td><i>Equity and Inclusion</i></td> </tr> <tr> <td><i>Adaptation to new situations</i></td> <td><i>Respect for the natural environment</i></td> </tr> <tr> <td><i>Decision making</i></td> <td><i>Sustainability</i></td> </tr> <tr> <td><i>Autonomous work</i></td> <td><i>Demonstration of social, professional and moral responsibility and sensitivity to gender issues</i></td> </tr> <tr> <td><i>Teamwork</i></td> <td><i>Critical thinking</i></td> </tr> <tr> <td><i>Working in an international environment</i></td> <td><i>Promoting free, creative and inductive reasoning</i></td> </tr> <tr> <td><i>Working in an interdisciplinary environment</i></td> <td></td> </tr> <tr> <td><i>Production of new research ideas</i></td> <td></td> </tr> </table>	<i>Search, analysis and synthesis of data and information,</i>	<i>Project design and management</i>	<i>ICT Use</i>	<i>Equity and Inclusion</i>	<i>Adaptation to new situations</i>	<i>Respect for the natural environment</i>	<i>Decision making</i>	<i>Sustainability</i>	<i>Autonomous work</i>	<i>Demonstration of social, professional and moral responsibility and sensitivity to gender issues</i>	<i>Teamwork</i>	<i>Critical thinking</i>	<i>Working in an international environment</i>	<i>Promoting free, creative and inductive reasoning</i>	<i>Working in an interdisciplinary environment</i>		<i>Production of new research ideas</i>	
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<ul style="list-style-type: none"> <li>• Develop skills in implementing air dispersion modelling tools</li> <li>• Develop skills in analysing the extracted simulation data</li> <li>• Environmental risk assessment and protection</li> </ul>																		

### 3. COURSE CONTENT

<ol style="list-style-type: none"> <li>1. Atmospheric forces, cycle and structure</li> <li>2. Atmospheric stability, flows and layer</li> </ol>
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3. Simulation tools of air pollutant dispersion (meteorological and chemical reactions)
4. Approximation methods
5. Gauss model
6. Apply Gauss or mesoscale model
7. Sensitivity analysis, validation and errors
8. Software The Air Pollution Model, ISCST3, Excel, Surfer
9. Sources and data input
10. Implementation of air pollutant dispersion software (point and linear sources)
11. Implementation of air pollutant dispersion software (point and linear sources)
12. Implementation of air pollutant dispersion software (point and linear sources)
13. Application of weather and pollutant dispersion simulation

#### 4. LEARNING & TEACHING METHODS - EVALUATION

<b>TEACHING METHOD</b> <i>Face to face, Distance learning, etc.</i>	Face to Face	
<b>USE OF INFORMATION &amp; COMMUNICATIONS TECHNOLOGY (ICT)</b> <i>Use of ICT in Teaching, in Laboratory Education, in Communication with students</i>	Implementation of software for simulation and data analysis	
<b>TEACHING ORGANIZATION</b> <i>The ways and methods of teaching are described in detail.</i> <i>Lectures, Seminars, Laboratory Exercise, Field Exercise, Bibliographic research &amp; analysis, Tutoring, Internship (Placement), Clinical Exercise, Art Workshop, Interactive learning, Study visits, Study / creation, project, creation, project. Etc.</i>  <i>The supervised and unsupervised workload per activity is indicated here, so that total workload per semester complies to ECTS standards.</i>	<b>Activity</b>	<b>Workload/semester</b>
	Lectures	30
	Software training	50
	Project development	40
	Assignment	30
	<b>Total</b>	<b>150</b>
<b>STUDENT EVALUATION</b> <i>Description of the evaluation process</i>  <i>Assessment Language, Assessment Methods, Formative or Concluding, Multiple Choice Test, Short Answer Questions, Essay Development Questions, Problem Solving, Written Assignment, Essay / Report, Oral Exam, Presentation in audience, Laboratory Report, Clinical examination of a patient, Artistic interpretation, Other/Others</i>  <i>Please indicate all relevant information about the course assessment and how students are informed</i>	Formative assessment 0% Summative assessment 100%	

#### 5. SUGGESTED BIBLIOGRAPHY

- Atmospheric Pollution S. Rapsomanikis, Free source in e- class.
- Turbulence and diffusion in the Atmosphere, Springer, by Alfred Blackadar.
- Tutor class material



## ANNEX OF THE COURSE OUTLINE

### Alternative ways of examining a course in emergency situations

<b>Teacher (full name):</b>	Stamatis Zoras
<b>Contact details:</b>	<a href="mailto:szoras@env.duth.gr">szoras@env.duth.gr</a>
<b>Supervisors: (1)</b>	Yes
<b>Evaluation methods: (2)</b>	Written assignment submitted on the Teams designated space
<b>Implementation Instructions: (3)</b>	A Teams link will be sent to students to apply distant learning

- (1) Please write YES or NO
- (2) Note down the evaluation methods used by the teacher, e.g.
  - *written assignment or/and exercises*
  - *written or oral examination with distance learning methods, provided that the integrity and reliability of the examination are ensured.*
- (3) In the **Implementation Instructions** section, the teacher notes down clear instructions to the students:
  - a) in case of **written assignment and / or exercises**: the deadline (e.g. the last week of the semester), the means of submission, the grading system, the grade percentage of the assignment in the final grade and **any other necessary information**.
  - b) in case of **oral examination with distance learning methods**: the instructions for conducting the examination (e.g. in groups of X people), the way of administration of the questions to be answered, the distance learning platforms to be used, the technical means for the implementation of the examination (microphone, camera, word processor, internet connection, communication platform), the hyperlinks for the examination, the duration of the exam, the grading system, the percentage of the oral exam in the final grade, the ways in which the inviolability and reliability of the exam are ensured and any other necessary information.
  - c) in case of **written examination with distance learning methods**: the way of administration of the questions to be answered, the way of submitting the answers, the duration of the exam, the grading system, the percentage of the written exam of the exam in the final grade, the ways in which the integrity and reliability of the exam are ensured and any other necessary information.

There should be an attached list with the Student Registration Numbers only of students eligible to participate in the examination.